WHAT IS CLAIMED IS:

1. A network controller for digitally directing communications with a plurality of remote devices via a common bus, the network controller comprising:

a transmitter for digitally transmitting messages via the common bus;

a receiver for receiving digital messages from the common bus; and

a clock for providing clock signals to both said transmitter and said receiver,

wherein both said transmitter and receiver are capable of selectively operating in either mode selected from the group consisting of a synchronous mode and an asynchronous mode, wherein said transmitter transmits both messages and the clock signals via the common bus in the synchronous mode, and wherein said transmitter transmits messages at a predetermined bit rate without any accompanying clock signals via the common bus in the asynchronous mode.

2. A network controller according to Claim 1 further comprising a clock transmitter for digitally transmitting the clock signals via the common bus, wherein said clock transmitter operates at a constant level during the asynchronous mode.

3. A network controller according to Claim 1 wherein said clock receives a baud select command that defines the predetermined bit rate at which said transmitter will transmit messages in the asynchronous mode.

4. A network controller according to Claim 1 wherein said network controller is capable of commanding a remote device to at least temporarily direct the communication with the other remote devices via the common bus.

5. A network controller according to Claim 1 wherein said receiver asynchronously receives messages from the common bus.

6. A network controller according to Claim 1 wherein the common bus is selected from a group consisting of differential twisted copper wire, coaxial copper wire, fiber-optic cable and single-ended copper wire.

7. A network controller according to Claim 1 wherein the network controller is capable of selectively operating in either communication mode selected from the group consisting of a half-duplex communication mode and a full-duplex communication mode.

8. A network controller according to Claim 1 wherein said network controller is capable of acting as a remote device while another, master network controller directs communications with the plurality of remote devices, including the network controller, via the common bus.

9. A network controller according to Claim 8, wherein said network controller is capable of interacting with a host computer having stack memory and random access memory (RAM), wherein when said network controller is acting as a remote device, the master network controller is capable of selectively accessing either type of memory selected from the group consisting of the stack of sequential memory and the RAM.

10. A network controller for digitally directing communications with a plurality of remote devices via a common bus, the network controller comprising:

a transmitter for transmitting digital messages to the plurality of remote devices via the common bus at a predetermined bit rate, said transmitter being capable of altering the predetermined bit rate at which messages are transmitted while communicating with the plurality of remote devices; and

a receiver for receiving digital messages from the plurality of remote devices via the common bus at the same predetermined bit rate at which messages were previously transmitted to the plurality of remote devices such that said receiver is capable of receiving messages as said transmitter alters the predetermined bit rate without relying upon any clock signals.

11. A network controller according to Claim 10 wherein said transmitter transmits an example message to the at least one remote device at an altered bit rate following alteration of the predetermined bit rate.

12. A network controller according to Claim 10 wherein said transmitter receives a baud select command that defines the predetermined bit rate at which the messages will be transmitted.

13. A method for digitally communicating between a network controller and a plurality of remote devices via a common bus, the method comprising:

configuring the controller based upon a command protocol according to which the plurality of remote devices are capable of communicating, wherein the plurality of remote devices are capable of communicating according to a command protocol selected from the group consisting of Manchester encoding and a Universal Asynchronous Receiver Transmitter (UART) protocol; and

transmitting messages between the bus controller and the plurality of remote devices according to the same command protocol with which the plurality of remote devices are capable of communicating.

14. A method according to Claim 13 wherein transmitting messages comprises transmitting messages according to the Manchester encoding command protocol if the plurality of remote devices are capable of communicating according to the Manchester encoding command protocol, and wherein transmitting messages according to the Manchester encoding command protocol comprises transmitting messages according to a mode selected from the group consisting of a synchronous mode and an asynchronous mode.

15. A method according to Claim 14 wherein transmitting messages in the synchronous mode comprises transmitting messages while concurrently transmitting a clock signal from the network controller to the plurality of remote devices via a common clock transmitter, and wherein transmitting messages in the asynchronous mode comprises transmitting messages at a predetermined bit rate without transmitting a clock signal.

16. A method according to Claim 14 wherein the messages comprise at least one message pulse, wherein transmitting messages according to the Manchester encoding command protocol comprises transmitting messages in the asynchronous

mode, and further comprising synchronizing the messages using an edge of the message pulse.

17. A method according to Claim 13 wherein transmitting messages comprises transmitting messages according to the Manchester encoding command protocol if the plurality of remote devices are capable of communicating according to the Manchester encoding command protocol, and wherein transmitting messages according to the Manchester encoding protocol comprises transmitting messages comprised of a plurality of bits, each having a value defined by a transition between first and second states.

18. A method according to Claim 13 wherein transmitting messages comprises transmitting messages according to the Manchester encoding command protocol if the plurality of remote devices are capable of communicating according to the Manchester encoding command protocol, and wherein transmitting messages according to the Manchester encoding command protocol comprises transmitting messages comprised of a sync portion, a message body and a parity flag.

19. A method according to Claim 18 wherein transmitting messages according to the Manchester encoding command protocol comprises transmitting messages comprised of a sync portion, a message body including an error flag bit, and a parity flag.

20. A method according to Claim 13 wherein transmitting messages comprises transmitting messages according to the UART command protocol if the plurality of remote devices are capable of communicating according to the UART command protocol, and wherein transmitting messages according to the UART protocol comprises transmitting messages at a predetermined bit rate and according to a non-return-to-zero (NRZ) bit format.

21. A method according to Claim 13 wherein transmitting messages comprises transmitting messages according to the UART command protocol if the plurality of remote devices are capable of communicating according to the UART command protocol, and wherein transmitting messages according to the UART

command protocol comprises transmitting an idle pattern to reset the plurality of remote devices prior to transmitting each message.

22. A method according to Claim 13 further comprising receiving a command protocol select command at the controller such that the subsequent configuration of the controller is based upon the command protocol select command.

23. A method according to Claim 13 wherein transmitting comprises selectively transmitting messages in either communication mode selected from the group consisting of a half-duplex communication mode and a full-duplex communication mode.

24. A network controller for digitally directing communications with a plurality of remote devices via a common bus, the network controller comprising:

a transmitter for transmitting digital messages via the common bus;

a receiver for receiving digital messages from the common bus; and

a clock for providing clock signals to both said transmitter and said receiver,

wherein both said transmitter and receiver are capable of selectively operating in accordance with any command protocol selected from the group consisting of Manchester encoding and Universal Asynchronous Receiver Transmitter (UART) protocol, wherein said transmitter and receiver are responsive to a command protocol select command that identifies the command protocol according to which the plurality of remote devices are capable of communicating such that said transmitter and receiver thereafter transmit and receive messages, respectively, in accordance with the command protocol identified by the protocol select command.

25. A network controller according to Claim 24 wherein said transmitter, while operating in accordance with the Manchester encoding command protocol, transmits messages according to the Manchester encoding command protocol, and wherein said transmitter transmits Manchester encoded messages according to a mode selected from the group consisting of a synchronous mode and an asynchronous mode.

26. A network controller according to Claim 25 wherein said transmitter transmits messages in the synchronous mode while concurrently transmitting a clock signal to the plurality of remote devices via a common clock bus, and wherein said transmitter transmits messages in the asynchronous mode at a predetermined bit rate without transmitting a clock signal.

27. A network controller according to Claim 24 wherein said transmitter transmits Manchester encoded messages comprised of a plurality of bits, each bit having a value defined by a transition between first and second states.

28. A network controller according to Claim 24 wherein said transmitter transmits Manchester encoded messages comprised of a sync portion, a message body and a parity flag.

29. A network controller according to Claim 24 wherein said transmitter transmits messages according to the UART protocol at a predetermined bit rate and utilizing a non-return-to-zero (NRZ) bit format.

30. A network controller according to Claim 24 wherein said transmitter, while operating in accordance with the UART command protocol, transmits an idle pattern to reset the plurality of remote devices prior to transmitting each message.

31. A network controller according to Claim 24 wherein said transmitter transmits messages via the common bus selected from a group consisting of differential twisted copper wire, coaxial copper wire and fiber-optic cable.

32. A network controller according to Claim 24 wherein the network controller is capable of selectively operating in either communication mode selected from the group consisting of a half-duplex communication mode and a full-duplex communication mode.

33. A network controller for digitally directing communications with a plurality of remote devices via a common bus, the bus controller comprising:

a transmitter for transmitting digital messages via the common bus, said transmitter adapted to transmit messages comprising a command and an address of at least one remote device, said transmitter being further adapted to simultaneously transmit messages to a plurality of remote devices in accordance with a group address comprised of a plurality of bits with each bit associated with a respective group, thereby enabling said transmitter to direct a message to a group of remote devices by setting the respective bit of the group address; and

a receiver for receiving digital messages from the common bus.

34. A network controller according to Claim 33 wherein said transmitter is also adapted to transmit messages to individual remote devices in accordance with a unique logical addresses assigned to the plurality of remote devices.

35. A network controller according to Claim 34 wherein said transmitter is also adapted to transmit messages to all of the plurality of remote addresses in accordance with a global address.

36. A network controller for digitally directing communications with a plurality of remote devices via a common bus, the network controller comprising:

a transmitter for digitally transmitting messages via the common bus; and

a receiver for receiving digital messages from the common bus,

wherein the transmitter is capable of transmitting an indefinitely repeating sequence of predetermined messages via the common bus, the receiver is capable of receiving an indefinitely repeating sequence of messages from the common bus, and wherein the network controller is capable of altering the predetermined messages as the transmitter transmits messages and the receiver receives messages.

37. A network controller according to Claim 36 further comprising a clock for providing clock signals to both said transmitter and said receiver, wherein both said transmitter and receiver are capable of selectively operating in either mode selected from the group consisting of a synchronous mode and an asynchronous mode, wherein said transmitter transmits both the messages and the clock signals via the common bus in the synchronous mode, and wherein said transmitter transmits the

messages at a predetermined bit rate without any accompanying clock signals via the common bus in the asynchronous mode.

38. A monitoring system for monitoring various locations of interest on an object comprising:

a first set of remote devices located at a first position of interest on the object;

a second set of remote devices located at a second position of interest on the object remote from the first position;

a network controller for sending digital commands and data to and receiving data from the remote devices; and

a common bus connecting each of the remote devices of each of said first and second sets of remote devices, wherein said common bus comprises:

first electrical wiring for interconnecting each of the remote devices of said first set of remote devices together, and second electrical wiring for interconnecting each of the remote devices of said second set of remote devices together; and

optical fibers for interconnecting the first set of remote devices at the first position to the second set of remote devices at the second position, wherein the use of said optical fibers to span from the first to the second position facilitates transmission of the commands and data between said network controller and the remote devices.

39. A monitoring system according to Claim 38 further comprising at least one translation device connected between one of said first and second electrical wiring and optical fibers, wherein said translation device translates electrical signals from said electrical wiring into optical signals for transmission across said optical fibers and translates optical signals from said optical fibers into electrical signals for transmission across said electrical wiring.

40. A monitoring system according to Claim 39, wherein said first and second electrical wiring of said common bus is half-duplexed and said optical fibers of said common bus are full-duplexed, and wherein said translation device translates digital commands and data transmitted on said common digital bus from half-duplex to full-duplex for transmission on said optical fibers and from full-duplex to half-duplex for transmission on said first and second electrical wiring.

41. A monitoring system according to Claim 40, wherein said translation device comprises:

a transceiver in electrical communication with said electrical wiring and said optical fibers of said common bus for receiving and transmitting digital commands and data; and

logic in electrical communication with said transceiver for translating electrical signals from said electrical wiring into optical signals for transmission across said optical fibers and translating optical signals from said optical fibers into electrical signals for transmission across said electrical wiring.

42. A monitoring system according to Claim 41, wherein said logic translates digital commands and data from said electrical wiring into full-duplex format for transmission across said optical fibers and translates commands and data from said optical fibers into half-duplex format for transmission across said electrical wiring.